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November 21, 2016

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Re: Feasibility of Use of OCSD Ocean Discharge Facilities for Poseidon Recycled Water Reject Flow

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On November 14, 2016 OCSD staff members Jim Colston and Kathy Millea participated in a conference call with staff from the Santa Ana Regional Water Quality Control Board and the State Water Resources Control Board. The purpose of the call was to discuss the feasibility of the Orange County Sanitation District (OCSD) receiving Poseidon reverse osmosis reject flow for discharge to the ocean. For the reasons discussed below, OCSD staff does not believe that it would be feasible under current conditions to receive such flows.

Background

Based on the conference call, OCSD staff understands the following basics of the proposed project by Poseidon. The project will be co-located in Huntington Beach with the current AES power plant using the AES cooling water intake as the source water for recycling. In order to produce the final product water, Poseidon would use reverse osmosis technology. The reject water from this process is super-saline. Local sea water varies from 33,000 to 36,000 part per million (ppm) salt. The reject water is estimated at 63,000 ppm salt. Due to the size of the project, the reject water flow rate is estimated at 50-60 million gallons per day (mgd).

OCSD receives, treats, recycles and disposes of wastewater from central and northern Orange County, serving 2.5 million residents as well as commercial and industrial properties. During dry weather, OCSD receives about 185 mgd influent into two wastewater treatment plants located in Fountain Valley and Huntington Beach California. In conjunction with the Orange County Water District, the agencies implement the Groundwater Replenishment System (GWRS). This is a world renowned water recycling project that uses advanced treatment to recycle treated wastewater for indirect potable reuse, providing a sustainable source of drinking water for local residents.

In 2015, OCWD and OCSD completed the Initial Expansion of GWRS. Using 130 mgd of treated wastewater, a net 100 mgd of product water is achievable on a continuous basis. This reduces the net discharge to the OCSD outfall to an average of f 85 mgd. With funding from the Bureau of Reclamation, OCSD and OCWD just completed a study of the Final Expansion of GWRS. Both agencies have approved the project to produce a net 130 mgd of project water, resulting in a final discharge to the OCSD outfall of about 55 mgd. Due to the diurnal nature of wastewater flow, the completed project will include three secondary effluent holding tanks. This allows GWRS to operate on a steady and continuous basis. Two of the three tanks were completed for Initial Expansion, but one more is needed for Final Expansion.

As explained to OCSD staff during the conference call, the use of a fresh water outfall must be evaluated as an option in consideration of approval of the Poseidon project. The 50-60 mgd of Poseidon's super saline reject water would go directly to OCSD's ocean outfall system (without going through the wastewater treatment process). This would require piping to and through OCSD's Huntington Beach wastewater treatment plant to the outfall system. The flow would be co-mingled with OCSD's effluent prior to discharge to the ocean environment through OCSD's deep ocean outfall.

Feasibility Analysis

For numerous reasons, it is not feasible for OCSD to accommodate the receipt of the Poseidon super-saline reverse osmosis reject water.

1. As noted above, the amount of dry-weather flow to the ocean outfall is declining due to wastewater recycling through the GWRS. With the completion of Final Expansion, flows will drop as low as 55 mgd. Since OCSD operates with diurnal flows from the community (higher during the day and lower at night), night-time hourly flow rates would be substantially lower. This will limit the availability of low salt effluent for dilution with the super-saline water.
2. OCSD's Board approved Strategic Plan has the goal of 100% reuse of reclaimable wastewater. By accepting these flows for comingling, OCSD would commit that some of its current effluent would be needed to offset the salinity of the Poseidon reject water. As such, it would limit the reuse of water which is of a much higher quality (lower salinity) for future reuse. Final Expansion, OCSD projects that its final effluent salt concentration will be 5,600 ppm salinity. This is 5-6 times less than sea water. This is not just a theoretical consideration. OCSD has the adopted Strategic Plan goal to recycle 100% of its reclaimable influent. OCSD staff have already identified about 20 mgd of low salinity water in the remaining influent that could be used for recycling. Also, the National Water Research Institute

3. Independent Advisory Panel for the GWRS has recently recommended that OCWD evaluate the use of its reverse osmosis reject water as a new source water for GWRS. As such, there simply may not be sufficient flows of low salinity effluent to comingle with Poseidon flows to the outfall while achieving compliance with the California Ocean Plan water quality standards.

4. The receipt of Poseidon flow to OCSD is inconsistent with current and planned capital improvements at OCSD's Huntington Beach treatment plant (Plant No. 2). The planned Poseidon flows are 50-60 mgd. This would mean a pipeline of 54" to 66" in diameter running through the treatment plant to the outfall system. This is a major undertaking in terms of space, planning and expense. Plant No. 2 is space constrained due to the number of capital improvements needed to meet the secondary treatment requirements, future treatment facilities and regulatory requirements, GWRS facilities (including a new equalization tank), and the many ancillary and support facilities needed for a large wastewater treatment plant. In fact, OCSD recently entered into a contract to purchase a neighboring property for more than $10 million due to space limitations with our current property boundaries, and a recent engineering study recommended that OCSD consider purchasing more properties. Recently, we informed a long-term lease holder that we would not renew a lease on our Plant No. 2 property due to space constraints, precisely in the area of the plant where any such pipeline for Poseidon might be located.

   Additionally, OCSD recently conducted a major rehabilitation of the land side of the Ocean Outfall system. This included our effluent pumping systems, 120" pipelines, surge towers, beach box, and ancillary structures. This system was not constructed or rehabilitated to handle super-saline flows. As such, a detailed evaluation of the impacts of receiving these flows would be required to accommodate a salt water discharge.

5. Planned low-flow pumping. The current ocean outfall booster station (OOBS) has four 120 mgd pumps. Due to the current and planned low flows, OCSD is planning a new low flow pumping system. This system is currently in design. The Poseidon flows are so significant that it would require reconsideration of this system in order to take advantage of the efficiencies of pumping curves.

6. The Poseidon flows would be plumbed directly to the outfall for comingling. All influent flows to the outfall receive secondary treatment prior to discharge to the outfall, and we do not allow discharges directly to

the outfall system (a limited exception was made in the prior decade for onsite construction dewatering of OCSD's own facilities). Allowing direct discharge and comingling to the outfall system would require significant changes to OCSD's ocean discharge permit (NPDES) and monitoring and reporting program. These changes would be necessary to accommodate complex compliance requirements. Finally, OCSD's wastewater ordinance does not have the legal authority to issue an industrial permit to a facility to discharge directly to the outfall. It would be necessary for OCSD's Board of Directors to either amend the wastewater ordinance or contract with Poseidon to allow for this discharge.

Conclusion

For all these reasons, OCSD staff does not believe that receipt of flows from Poseidon to OCSD's outfall of super-saline reverse osmosis reject water is feasible. If the RWQCB staff and/or Poseidon would like to conduct a more thorough evaluation of the feasibility of a project to comingle Poseidon reject flows with OCSD effluent, OCSD staff estimates that such a study would cost $250,000 to $1 million. We can meet to discuss further. If you have further questions regarding this matter, please contact me at (714) 593-7450 or Planning Manager, Kathy Millea, at (714) 593-7365.

James E. Colston
Environmental Services Director

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